

Atty. Docket No. YOR20000388US1
(590.022)

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of providing pattern recognition, said method comprising the steps of:

inputting a pattern;

transforming the input pattern to provide a set of at least one feature for a classifier which classifies into classes, wherein there is only one feature space transformation for all classes;

said transforming step comprising the step of minimizing the probability of subsequent misclassification of the at least one feature in the classifier;

said minimizing step comprising:

developing an objective function, wherein said objective function maximizes an average pairwise divergence over all dimensions at a single step; and

optimizing the objective function through gradient decent[[,]]

~~wherein said minimizing step is performed non-incrementally.~~

2. (Cancelled)

Atty. Docket No. YOR20000388US1
(590.022)

3. (Cancelled)

4. (Original) The method of Claim 1, further comprising the step of querying whether the optimized objective function converges.

5. (Original) The method according to Claim 4, further comprising the step of repeating said optimizing step if the optimized objective function does not converge.

6. (Original) The method according to Claim 1, wherein said pattern recognition is speech recognition.

7. (Currently Amended) An [[A]] apparatus for providing pattern recognition, said apparatus comprising:

an input interface for inputting a pattern;

a transformer for transforming the input pattern to provide a set of at least one feature for a classifier which classifies into classes, wherein there is only one feature space transformation for all classes;

said transformer being adapted to minimize the probability of subsequent misclassification of the at least one feature in the classifier;

said transformer further being adapted to:

developing an objective function, wherein said objective function maximizes an average pairwise divergence over all dimensions at a single step;
and

Atty. Docket No. YOR20000388US1
(590.022)

optimizing the objective function through gradient decent[[,]] ~~wherein said minimization is performed non-incrementally.~~

8. (Cancelled)

9. (Cancelled)

10. (Original) The apparatus according to Claim 7, wherein said transformer is further adapted to query whether the optimized objective function converges.

11. (Original) The apparatus according to Claim 10, wherein said transformer is further adapted to repeat optimization of the objective function if the optimized objective function does not converge.

12. (Original) The apparatus according to Claim 7, wherein said pattern recognition is speech recognition.

13. (Currently Amended) A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for providing pattern recognition, said method comprising the steps of:

inputting a pattern;

transforming the input pattern to provide a set of at least one feature for a classifier which classifies into classes, wherein there is only one feature space transformation for all classes;

Atty. Docket No. YOR20000388US1
(590.022)

said transforming step comprising the step of minimizing the probability of subsequent misclassification of the at least one feature in the classifier;

said minimizing step comprising:

developing an objective function, wherein said objective function maximizes an average pairwise divergence over all dimensions at a single step;
and

optimizing the objective function through gradient decent[[,]] ~~wherein said minimization is performed non-incrementally.~~

14. (Previously Presented) The method according to claim 1, wherein said objective function is an average pairwise divergence related to the probability of misclassification of a projected space based on classes having uniform prior probabilities.

15. (Cancelled)

16. (Cancelled)

17. (Previously Presented) The method according to claim 1, wherein said objective function comprises means, covariances, and prior probabilities.

Atty. Docket No. YOR20000388US1
(590.022)

18. (Previously Presented) The method according to claim 1, wherein said objective function is expressed by the following equation:

$$D_{\theta} = \frac{1}{C(C-1)} \text{trace} \left\{ \sum_{i=1}^C (\theta \Sigma_i \theta^T)^{-1} \theta S_i \theta^T \right\} - p$$

$$\text{where } S_i = \sum_{j \neq i} \Sigma_j + (\mu_i - \mu_j)(\mu_i - \mu_j)^T, i = 1, \dots, C.$$